

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
TEST -1 EXAMINATIONS-2022  
M.Sc-I Semester (Microbiology)

COURSE CODE (CREDITS): 21MSMB112 (3)

MAX. MARKS: 15

COURSE NAME: Molecular Biology

COURSE INSTRUCTORS: Dr Anil Kant

TIME: 1 Hour

MAX.

*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

Q1.

[1.5x2 = 3]

- A) Thermal denaturation and renaturation profile of DNA, RNA samples is given below analyze and attribute reason for i) difference in denaturation profile of DNA and RNA ii) renaturation profile of DNA in rapid cooling and slow cooling conditions
- B) You have diluted a DNA sample 10 times, and UV absorption was recorded as  $\lambda_{260} = 1.4$ ,  $\lambda_{280} = 0.80$ . Calculate concentration of DNA and comment on its purity.

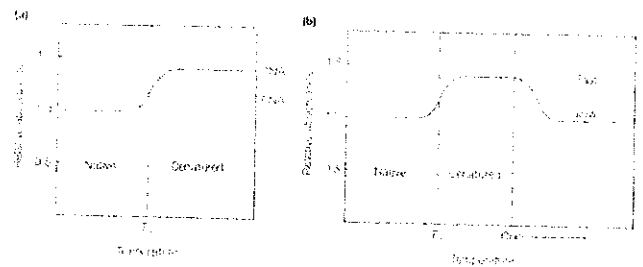


Fig. 2. (a) Thermal denaturation of double-stranded DNA (dsDNA) and RNA; (b) renaturation of DNA by fast and slow cooling.

Q.2

Let E.coli strain with the following gene mutations. How replication would be affected. Mention main effect and its reason (Two lines in each case)

[4]

- $\epsilon$  subunit of DNA polymerase III is mutated
- $\alpha$  subunit DNA polymerase III is mutated
- $\beta$  subunit DNA polymerase III is mutated
- DNA polymerase I coding gene is mutated
- Dna A protein gene is mutated
- Dna B protein gene is mutated
- There is no activity of DNA gyrase
- Dna G primase gene is mutated

Q.3 Do any four of the following.

[2.0 x 4 = 8.0]

- The subject matter of Molecular Biology appropriately represented by its Central dogma? Justify.
- Enlist different classes of biological information transfer and correlate these with biological processes.
- Compare transformation experiments of Griffith with that of Avery and his associates? Argue why Griffith's work was not evidence for DNA as the genetic material, whereas the experiments of Avery and coworkers provided direct proof that DNA carried the genetic information?
- Illustrate the experiments which proved that replication proceeds bidirectionally from replication fork
- Mention three points which indicate that DNA pol I is not a true replicase in E.coli?